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A Patchy Model for Tick-borne Disease Spread with Patch-Specific Developmental Delays

We introduce a two-patch model with multiple delays to describe how tick population dynamics is affected by host mobility and local environmental factors.

In this talk, I will start by giving a brief introduction on ticks with particular interest on their lifecycle, suitable environments for their development and possible tick-control strategies. Then, I will describe the model and explain how the dynamical behaviors depend on patch-specific basic reproduction numbers and host mobility by using singular perturbation analyses and monotone dynamical systems theory. Finally, I will discuss how these results might provide useful insights for tick population control strategies.

This is a joint work with Prof. Xue Zhang and Prof. Jianhong Wu.